



**Department of Energy**

Carlsbad Field Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221



**AUG 26 2004**

Mr. Steve Zappe, WIPP Project Leader  
Hazardous Waste Permits Program  
New Mexico Environment Department  
2905 E. Rodeo Park Drive, Bldg. 1  
Santa Fe, NM 87505



Subject: Transmittal of Approved RFETS WSPF Number RF107.03 - TRU Mixed  
Solidified Inorganic Waste

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office (CBFO) has approved the Rocky  
Flats Environmental Technology Site (RFETS) Waste Stream Profile Form (WSPF)  
RF107.03 - TRU Mixed Solidified Inorganic Waste

Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP  
Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or  
(505) 706-0066.

Sincerely,

Kerry W. Watson  
CBFO Assistant Manager  
Office of National TRU Program

Enclosure

cc: w/o enclosure  
J. Kielling, NMED  
C. Walker, TechLaw  
M. Strum, WTS \*ED  
R. Chavez, WRES \*ED  
L. Greene, WRES  
S. Calvert, CTAC \*ED  
WIPP Operating Record  
CBFO M&RC

\*ED denotes Electronic Distribution



## WIPP WASTE STREAM PROFILE FORM

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Waste Stream Profile Number: RF107.03

Generator site name: RFETS

Technical contact: Eric D'Amico

Generator site EPA ID: CO7890010526

Phone number: (303) 966-5362

Date of audit report approval by NMED: March 9, 2000 as amended February 6, 2001; May 24, 2001; June 5, 2001; April 5, 2002; April 8, 2002; August 20, 2002; August 29, 2002; December 20, 2002; April 8, 2003; September 19, 2003; December 30, 2003 and July 14, 2004

Title, version number, and date of documents used for WAP certification: Rocky Flats Environmental Technology Site TRU Waste Characterization Program Quality Assurance Project Plan, 95-QAPJP-0050, Version 9, February 2004.

Transuranic (TRU) Waste Management Manual, 1-MAN-008-WM-001, Version 7, February 2004. Contact-Handled

Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Revision 1.0, March 2004.

Did your facility generate this waste? ☒ Yes ☐ No If no, provide the name and EPA ID of the original generator:

**Waste Stream Information<sup>(1)</sup>**

WIPP ID: RF-MT0007, RF-MT0803, and RF-MT0807

Summary Category Group: S3000

Waste Matrix Code Group: Solidified Inorganics

Waste Stream Name: TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009)<sup>(2)</sup>Description from the WTWBIR: This waste stream is a solid cemented sludge.<sup>(2)</sup>Defense TRU Waste: ☒ Yes ☐ NoCheck one: ☒ CH ☐ RH Number of SWBs N/A Number of Drums 340 Number of Canisters N/A

Batch Data Report numbers supporting this waste stream characterization: See Table 7.

List applicable EPA Hazardous Waste Codes<sup>(3)</sup>: F001, F002, F005, F006, F007, F009

Applicable TRUCON Content Codes: RF111A/211A, RF111B/211B, RF111D/211D, RF111DF/211DF, RF111E/211E, RF111H/211H, RF111J/211J, RF111K/211K, RF111P/211P, RF111PF/211PF, RF127A/227A, RF127D/227D, RF127DF/227DF, RF127E/227E, RF127F/227F, RF127H/227H, RF127J/227J, RF127K/227K, RF127N/227N, RF127P/227P, RF127PF/227PF

**Acceptable Knowledge Information<sup>(1)</sup>****Required Program Information**

- Map of site: Reference List, No. 3
- Facility mission description: Reference List, No. 3
- Description of operations that generate waste: Reference List, Nos. 1, 2, 3, 6
- Waste identification/categorization schemes: Reference List, Nos. 13, 14
- Types and quantities of waste generated: Reference List, Nos. 1, 2, 3, 6
- Correlation of waste streams generated from the same building and process, as appropriate: Reference List, Nos. 1, 2, 6
- Waste certification procedures: Reference List, No. 5

**Required Waste Stream Information**

- Area(s) and building(s) from which the waste stream was generated: Reference List, Nos. 1, 2, 6
- Waste stream volume and time period of generation: Reference List, Nos. 4, 6
- Waste generating process description for each building: Reference List, Nos. 1, 2, 6
- Process flow diagrams: Reference List, Nos. 1, 2
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: Reference List, Nos. 1, 2, 3, 6
- Which Defense Activity generated the waste: (Check one) Reference List, No. 3
  - ☒ Weapons activities including defense inertial confinement fusion
  - ☐ Verification and control technology
  - ☐ Defense nuclear waste and material by products management
  - ☐ Defense nuclear waste and materials security and safeguards and security investigations
  - ☐ Naval Reactors development
  - ☐ Defense research and development
  - ☐ Defense nuclear materials production

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Supplemental Documentation:

- Process design documents: Note 4
- Standard operating procedures: Note 4
- Safety Analysis Reports: Note 4
- Waste packaging logs: Note 4
- Test plans/research project reports: Note 4
- Site data bases: Note 4
- Information from site personnel: Note 4
- Standard industry documents: Note 4
- Previous analytical data: Note 4
- Material safety data sheets: Note 4
- Sampling and analysis data from comparable/surrogate Waste: Note 4
- Laboratory notebooks: Note 4

Sampling and Analysis Information<sup>(1)</sup>*[For the following, when applicable, enter procedure title(s), number(s) and date(s)]*

- ☒ Radiography: Reference List, Nos. 21, 22, 23
- ☒ Visual Examination: Reference List, Nos. 17, 24, 25, 26
- ☒ Headspace Gas Analysis
  - VOCs: Reference List, No. 7, 19, 20
  - Flammable: Reference List, No. 7, 19, 20
  - Other gases (specify): N/A
- ☒ Homogeneous Solids/Soils/Gravel Sample Analysis
  - Total metals: Reference List, Nos. 11, 12
  - PCBs: N/A
  - VOCs: Reference List, No. 8
  - Nonhalogenated VOCs: Reference List, No. 10
  - Semi-VOCs: Reference List, No. 9
  - Other (specify): N/A

Waste Stream Profile Form certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Al Ballinger for  
Signature of Site Project Manager

G. A. O'Leary, Manager TRU Programs  
Printed Name and Title

8/3/04  
Date

C. L. Ferrera  
Signature of Site QA Officer

C. L. Ferrera, TWCP Site QAO  
Printed Name and Title

8/3/04  
Date

- NOTE**
- (1) Use back of sheet or continuation sheets, if required.
  - (2) The WTWBIR Waste Stream Name for RF-MT0007 is Bypass Sludge Bldg. 374/TRM, for RF-MT0803 is Solidified Sludge - Bldg. 774/TRM, and for RF-MT0807 is Solidified Sludge - Bldg. 374/TRM. The Waste Stream Name for RF-MT0803 is incorrect in that the Solidified Sludge is from Building 374 and not from Building 774. The Waste Stream Description requires clarification in that any liquid present will be as residual liquid in a quantity that is less than one volume percent of the payload container. The Waste Matrix Code has been re-designated Waste Matrix Code S3190, as the waste stream does not require further treatment for disposal.
  - (3) EPA Hazardous Waste Codes were determined using acceptable knowledge and confirmed using solids and headspace gas sampling and analysis (see attached Characterization Information Summary documenting this determination).
  - (4) See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.

## REFERENCE LIST

1. Backlog Waste Reassessment Baseline Book, Waste Form 4, Building 374 Solidified Sludge, July 2004.
2. Waste Stream and Residue Identification and Characterization (WSRIC), Version 7, April 2004, and archived versions.
3. RFETS TRU Waste Acceptable Knowledge Supplemental Information, RF/RMRS-97-018, Revision 13, May 2004.
4. Waste and Environmental Management System (WEMS) database.
5. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Version 7, March 2004.
6. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Section 7.28, Revision 0, July 2004.
7. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-X, January 2002.
8. Volatile Organic Compounds by Gas Chromatography Mass Spectrometry, ACMM-9260, Revision 9, July 2003.
9. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry, ACMM-9270, Revision 5, April 2003.
10. Determination of Nonhalogenated Volatile Organics by Gas Chromatography, ACMM-9441, Revision 8, April 2003.
11. Determination of Mercury by CVAA for TRU Waste Characterization, ACMM-2810, Revision 2, April 2003.
12. Determination of Metals by ICP-AES for TRU Waste Characterization, ACMM-2901, Revision 2, April 2003.
13. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 4, May 2002.
14. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 3, May 2002.
15. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF107.03 (TRM Solidified Inorganic Waste [F001, F002, F005, F006, F007, F009]) Lot 1, TRG-174-04, June 10, 2004.
16. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Statistical Solid Analysis Data Evaluation Report For Transuranic Mixed (TRM) Solidified Inorganic Waste [F001, F002, F005, F006, F007, F009] (Waste Stream Profile RF107.03) Lot 1, TRG-155-04, May 20, 2004.
17. TRU/TRM Waste Visual Verification ( $V^2$ ) and Data Review, PRO-1031-WIPP-1112, Version 3, March 2004.
18. Interoffice Memorandum from V. S. Sendelweck to E. L. D'Amico, Tentatively Identified Compounds in TRM Solidified Inorganic Waste Lot 1, VSS-028-2004, July 2004.
19. Headspace Gas Sampling And Analysis Using An Automated Manifold, L-4231-F, March 2002.
20. Headspace Gas Sampling and Analysis Using An On-Line Integrated System, PRO-1676-HGAS-S&A, Version 2, January 2004.
21. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Version 10, March 2004.
22. Real-Time Radiography Testing of Transuranic and Low-Level Waste in Building 569, 4-I19-NDT-00569, Revision 5, January 2002.
23. Mobile Real-Time Radiography Testing of Transuranic and Low-Level Waste, PRO-1520-Mobile-RTR, Version 3, March 2004.
24. Glovebox and C-Cell Waste Operations, PRO-1358-440-VERP, Version 6, March 2004.
25. RTR Visual Examination Confirmation, Building 371, PRO-1608-VECRR-371, Revision 0, October 2002.
26. Visual Examination for Confirmation of RTR, 4-H80-776-ASRF-007, Revision 5, June 2001.
27. TWCP Core-Drilling Operation, HFEF-OI-6910, Revision 2c, April 2003.
28. TWCP Solid Sample Preparation, HFEF-OI-6921, Revision 3c, July 2003.
29. Interoffice Memorandum from M. L. Johnson to E. L. D'Amico, Solid Sampling Control Chart Effectiveness Evaluation for Waste Stream RF107.03, MLJ-047-04, July 2004.

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**Form A**  
**Reconciliation with Data Quality Objectives**

I certify by signature (below) that sufficient data have been collected to determine the following Program-required waste parameters:

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| Item | Check Box <sup>a</sup> | Reconciliation Parameter  |
|------|------------------------|---|
| 1    | ✓                      | Waste Matrix Code as reported in WEMS.  |
| 2    | ✓                      | Waste Material Parameter Weights for individual containers as reported in WEMS.   |
| 3    | ✓                      | The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.   |
| 4    | ✓                      | Container mass and activities of each radionuclide of concern as reported in WEMS.  |
| 5    | ✓                      | Each waste container of waste contains TRU radioactive waste.   |
| 6    | ✓                      | Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and the number of samples collected for each VOC in the headspace gas of waste containers in the waste stream/waste stream lot.  |
| 7    | ✓                      | Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for VOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.   |
| 8    | ✓                      | Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.  |
| 9    | ✓                      | Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for metals in the waste stream/waste stream lot. Summary Categories S3000 and S4000.   |
| 10   | ✓                      | Sufficient number of samples was taken to meet statistical sampling requirements.   |
| 11   | ✓                      | Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.   |
| 12   | ✓                      | Waste containers were selected randomly for sampling, as documented in site procedures.   |
| 13   | ✓                      | The potential flammability of TRU waste headspace gases.  |
| 14   | ✓                      | Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL <sub>90</sub> for the misclassification rate is less than 14 percent.  |
| 15   | ✓                      | Whether the waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.  |
| 16   | ✓                      | All TICs were appropriately identified and reported in accordance with the requirements of the WIPP WAP prior to submittal of a waste stream profile form for a waste stream or waste stream lot.   |
| 17   | ✓                      | The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WIPP WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot. |
| 18   | ✓                      | The RTLs (i.e., PRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.  |
| 19   | ✓                      | Appropriate packaging configuration and DAC were met and documented in the headspace gas sampling documentation and the drum age was met prior to sampling.   |
| 20   | ✓                      | Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.  |

<sup>a</sup> Check (✓) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream. NO indicates data are insufficient.

*R. Ballinger, Jr.*  
 Signature of Site Project Manager

G. A. O'Leary  
 Printed Name

8/3/04  
 Date

## Data Summary Report—Table 1: Solid Sampling Summary

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**Determination of Number of Retrievably Stored Waste Containers to Sample (S3000;S4000).**

Preliminary Estimates of Mean, Variance, and Coefficient of Variation:

Attach a table(s) that correlates container identification numbers to data packages if different from containers used for characterization.

Description of Source Data: Preliminary samples were collected and analyzed in compliance with all requirements (specified in the WIPP Waste Analysis Plan Section B2-2a) and are being counted as part of the total number of calculated required samples. Sufficient preliminary samples were collected to demonstrate sampling sufficiency – i.e., collection of additional samples other than the preliminary samples was not required. See Reference List, No 16.

Samples Randomly Selected from Waste Stream (yes/no)? Yes.

Treatment of less-than-detectable measurements: This pertains only to data for analytes in which at least one detectable measurement was obtained. Data were evaluated using one half the method detection limit (MDL) for less-than-detectable observations. See Reference List, No. 16.

Analytes that are listed spent solvents and therefore not included in the calculation to determine the number of containers to sample: Benzene, Carbon Tetrachloride, Chlorobenzene, Methyl Ethyl Ketone, Pyridine, Tetrachloroethylene, Trichloroethylene, Toluene, Cadmium, Chromium, Lead and Silver.

Largest Calculated Sample Size selection and associated analyte: Pertains only to toxicity characteristic or listed waste analytes and only to those analytes where the associated EPA hazardous waste number is not assigned (i.e., it only applies to those cases where a site intends to establish that the constituent is below the regulatory threshold and the associated EPA hazardous waste number does not apply). Largest value is 0.094 for mercury.

Minimum number of containers to sample: 5 (based on WIPP Waste Analysis Plan Section B2-2a requirement that preliminary estimates be based on samples from a minimum of 5 waste containers).

Attach preliminary estimates: See Reference List, No. 16. Preliminary estimates are identical to final results because sufficient preliminary samples were collected and analyzed in compliance with all requirements for being used as required samples.

## Data Summary Report—Table 1: Solid Sampling Summary (continued)

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**Retrievably Stored Waste Sampling Results**

Analytes that are toxicity characteristic contaminants associated with assigned F-codes and therefore not included in the  $UCL_{90}$  estimate calculation to determine the toxicity characteristic: Benzene, Carbon Tetrachloride, Chlorobenzene, Methyl Ethyl Ketone, Pyridine, Tetrachloroethylene, Trichloroethylene, Toluene, Cadmium, Chromium, Lead and Silver.

Largest Calculated Sample Size and associated analyte: Pertains only to toxicity characteristic or listed waste analytes and only to those analytes where the associated EPA hazardous waste number is not assigned (i.e., it only applies to those cases where a site intends to establish that the constituent is below the regulatory threshold and the associated EPA hazardous waste number does not apply). Largest value is 0.094 for mercury.

Comparison of largest calculated sample size with largest calculated sample size selected from preliminary estimate: 0.094 vs. 0.094 (for mercury)

Treatment of less-than-detectable measurements: This pertains only to data for analytes in which at least one detectable measurement was obtained. Data were evaluated using one half the method detection limit (MDL) for less-than-detectable observations. See Reference List, No. 16.

Transformations applied to data and justification: Logarithmic or Square Root transformations were applied to the data as necessary to achieve (or better achieve) a normal probability distribution of the data for  $UCL_{90}$  comparison to RTL values.

Drums overpacked for shipment/WWIS tracking (Yes/No)? No.

If yes, overpack container identification number: \_\_\_\_\_

Sampled drums included in waste stream lot reported here (Yes/No)? Yes.

If no, WSPF # including sampled drums: \_\_\_\_\_

**Newly Generated Waste Sampling Results**

Batch or continuous process? N/A<sup>a</sup>

Samples randomly selected from Waste Stream? (yes/no) N/A<sup>a</sup>

Sample locations (part of process): N/A<sup>a</sup>

Treatment of less-than-detectable measurements: N/A<sup>a</sup>

Transformations applied to data and justification: N/A<sup>a</sup>

Samples were collected by solid core drilling (Reference Nos. 27 and 28).

**NOTES:**

- <sup>a</sup> This waste stream is comprised of mostly retrievably stored waste (318 of 340 containers) that was sampled by coring. Control charting for this waste stream was determined not to be applicable and sampling and analysis was conducted using the retrievably-stored characterization strategy (see Reference No. 29).

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## Data Summary Report—Table 2: Headspace Gas Summary Data

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Sampling and Analysis Method (check one):

☒ 100% Sampling

☐ Reduced Sampling

2A

| ANALYTE <sup>a</sup>                  | # Samples <sup>b</sup> | Transform Applied <sup>c</sup> | Normality Test (Pass/Fail) <sup>d</sup> | Max. Value (ppmV) | Mean <sup>d</sup> | Std. Dev. <sup>d</sup> | UCL <sub>95</sub> <sup>d</sup> | Transformed RTL <sup>e</sup> | Un-Transformed RTL <sup>e</sup> (ppmV) | EPA Code <sup>f</sup> |
|---------------------------------------|------------------------|--------------------------------|---|-------------------|-------------------|------------------------|--------------------------------|------------------------------|--|-----------------------|
| 1,1-Dichloroethane                    | 0                      |                                |   | 2.9               | 1.19              |                        |                                |                              | 10                                     |                       |
| 1,2-Dichloroethane                    | 0                      |                                |   | 3.6               | 1.239             |                        |                                |                              | 10                                     |                       |
| 1,1-Dichloroethylene                  | 0                      |                                |   | 3.2               | 1.223             |                        |                                |                              | 10                                     |                       |
| cis-1,2-Dichloroethylene              | 0                      |                                |   | 3.2               | 1.311             |                        |                                |                              | 10                                     |                       |
| trans-1,2-Dichloroethylene            | 0                      |                                |   | 2.8               | 1.135             |                        |                                |                              | 10                                     |                       |
| 1,1,2,2-Tetrachloroethane             | 0                      |                                |   | 3.4               | 1.191             |                        |                                |                              | 10                                     |                       |
| 1,1,1-Trichloroethane                 | 0                      |                                |   | 3.1               | 1.317             |                        |                                |                              | 10                                     |                       |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | 0                      |                                |   | 2.8               | 1.1               |                        |                                |                              | 10                                     |                       |
| 1,2,4-Trimethylbenzene                | 0                      |                                |   | 2.5               | 1.115             |                        |                                |                              | NA                                     |                       |
| 1,3,5-Trimethylbenzene                | 0                      |                                |   | 2.9               | 1.101             |                        |                                |                              | NA                                     |                       |
| Acetone                               | 0                      |                                |   | 36                | 13.692            |                        |                                |                              | 100                                    |                       |
| Benzene                               | 0                      |                                |   | 2.8               | 1.117             |                        |                                |                              | 10                                     |                       |
| Bromoform                             | 0                      |                                |   | 2.4               | 1.078             |                        |                                |                              | 10                                     |                       |
| Butanol                               | 0                      |                                |   | 33                | 12.342            |                        |                                |                              | 100                                    |                       |
| Carbon disulfide                      | 0                      |                                |   | 3.6               | 1.341             |                        |                                |                              | 10                                     |                       |
| Carbon tetrachloride                  | 0                      |                                |   | 3.2               | 1.355             |                        |                                |                              | 10                                     |                       |
| Chlorobenzene                         | 0                      |                                |   | 2.8               | 0.988             |                        |                                |                              | 10                                     |                       |
| Chloroform                            | 0                      |                                |   | 2.6               | 1.119             |                        |                                |                              | 10                                     |                       |
| Cyclohexane                           | 0                      |                                |   | 3.4               | 1.362             |                        |                                |                              | NA                                     |                       |
| Ethyl benzene                         | 0                      |                                |   | 2.7               | 0.974             |                        |                                |                              | 10                                     |                       |
| Ethyl ether                           | 0                      |                                |   | 3.5               | 1.354             |                        |                                |                              | 10                                     |                       |
| Methanol                              | 0                      |                                |   | 30                | 11.742            |                        |                                |                              | 100                                    |                       |
| Methyl ethyl ketone                   | 0                      |                                |   | 34                | 13.775            |                        |                                |                              | 100                                    |                       |
| Methyl isobutyl ketone                | 0                      |                                |   | 33                | 11.042            |                        |                                |                              | 100                                    |                       |
| Methylene chloride                    | 0                      |                                |   | 3.0               | 1.226             |                        |                                |                              | 10                                     |                       |
| o-Xylene                              | 0                      |                                |   | 2.6               | 1.042             |                        |                                |                              | 10                                     |                       |
| m,p-Xylene                            | 0                      |                                |   | 5.5               | 2.037             |                        |                                |                              | 10                                     |                       |
| Tetrachloroethylene                   | 0                      |                                |   | 2.7               | 1.142             |                        |                                |                              | 10                                     |                       |
| Toluene                               | 5                      | Sq. Rt.                        | Fail <sup>g</sup>                       | 4.0               | 1.197             | 0.311                  | 1.281                          | 8.4865                       | 72.02 <sup>h</sup>                     |                       |
| Trichloroethylene                     | 0                      |                                |   | 2.7               | 1.053             |                        |                                |                              | 10                                     |                       |

### NOTES:

- <sup>a</sup> A total of 24 samples were collected and analyzed. Analysis was performed for all analytes identified. Samples were not composited.
- <sup>b</sup> Identifies the number of samples in which the associated analyte was detected.
- <sup>c</sup> Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.



## Data Summary Report—Table 2: Headspace Gas Summary Data (continued)

## NOTES (continued):

- <sup>d</sup> Statistics calculated based on using  $\frac{1}{2}$  the MDL for less-than-detectable observations with data transformation as identified (Reference 15). When transformation was applied, the Mean and  $UCL_{90}$  values presented are the transformed values (Reference 15). With no detectable concentrations, listed mean reflects average of one-half of reported MDL values for analyte and calculation of standard deviation and  $UCL_{90}$  values is not meaningful. With fewer than five detectable concentrations, calculated values for  $UCL_{90}$  are subject to potentially large relative error.
- <sup>e</sup> RTLs for headspace gas analysis results correspond to the analyte PRQL for analytes that are WIPP WAP target analytes. "NA" means the analyte is not a WIPP WAP target analyte, but instead a flammable VOC that is analyzed for compliance with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC).
- <sup>f</sup> No entry indicates that the respective  $UCL_{90}$  value did not exceed the associated RTL.
- <sup>g</sup> Data set (with or without transformation) did not pass the test for normality. The data set that most approximated a normal distribution was used for computation of statistics.
- <sup>h</sup> Limit used for evaluation of EPA Hazardous Waste Code for toluene (Reference No. 3).

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## Data Summary Report—Table 2: Headspace Gas Summary Data (continued)

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2B

| TENTATIVELY IDENTIFIED COMPOUND (TIC)  | Maximum Observed<br>Estimated Concentration<br>(ppmV) | # Samples<br>Containing TIC |
|--|---|-----------------------------|
| No TICs identified in the headspace gas samples<br>for the waste stream lot. |   |                             |

Did the data verify the acceptable knowledge? ☒ Yes ☐ No

Data as reported in Data Summary Report – Table 2 confirms acceptable knowledge in that no additional EPA codes are applicable.

If not, describe the basis for assigning the EPA Hazardous Waste Codes:

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## Data Summary Report—Table 3: Metals Summary Data

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Sampling and Analysis Method/Units (check one):

☒ Totals (units are in mg/kg)

☐ TCLP (units are in mg/l)

| ANALYTE <sup>a</sup> | # Samples <sup>b</sup> | Transform Applied <sup>c</sup> | Normality Test (Pass/Fail) <sup>d</sup> | Min. Sample Size <sup>d</sup> | Mean <sup>d</sup> | UCL <sub>90</sub> <sup>d</sup> | Transformed RTL <sup>e</sup> | Un-Transformed RTL <sup>e</sup> (mg/L) | EPA Code <sup>f</sup> |
|----------------------|------------------------|--------------------------------|---|-------------------------------|-------------------|--------------------------------|------------------------------|--|-----------------------|
| Antimony             | 7                      | Sq. Rt.                        | Pass                                    | 0.011                         | 2.22              | 2.526                          | 10                           | 100                                    |                       |
| Arsenic              | 6                      | Sq. Rt.                        | Pass                                    | 0.008                         | 1.45              | 1.738                          | 10                           | 100                                    |                       |
| Barium               | 7                      | Log                            | Pass                                    | 0.034                         | 3.334             | 3.630                          | 7.601                        | 2000                                   |                       |
| Beryllium            | 7                      | Log                            | Pass                                    | 5.891                         | 3.987             | 4.554                          | 4.605                        | 100                                    |                       |
| Cadmium              | 7                      | Log                            | Pass                                    | 0.427                         | 1.677             | 2.002                          | 2.996                        | 20                                     |                       |
| Chromium             | 7                      | Log                            | Pass                                    | 15.253                        | 4.438             | 4.685                          | 4.605                        | 100                                    | D007                  |
| Lead                 | 7                      | Log                            | Pass                                    | 0.163                         | 3.337             | 3.530                          | 4.605                        | 100                                    |                       |
| Mercury              | 7                      | Log                            | Pass                                    | 0.094                         | 0.424             | 0.536                          | 1.386                        | 4                                      |                       |
| Nickel               | 7                      | Log                            | Pass                                    | 4.330                         | 4.063             | 4.489                          | 4.605                        | 100                                    |                       |
| Selenium             | 5                      | None                           | Pass                                    | 0.010                         | 1.899             | 2.589                          | N/A                          | 20                                     |                       |
| Silver               | 7                      | Sq. Rt.                        | Pass                                    | 29.797                        | 10.984            | 13.014                         | 10                           | 100                                    | D011                  |
| Thallium             | 7                      | None                           | Pass                                    | 0.000                         | 2.129             | 2.553                          | N/A                          | 100                                    |                       |
| Vanadium             | 7                      | Log                            | Pass                                    | 0.084                         | 2.548             | 2.774                          | 4.605                        | 100                                    |                       |
| Zinc                 | 7                      | Log                            | Pass                                    | 0.431                         | 6.279             | 6.694                          | 4.605                        | 100                                    | None                  |

Did the data verify the acceptable knowledge? ☒ Yes ☐ No

Data as reported in Data Summary Report – Table 3 confirms acceptable knowledge in that no toxicity characteristic metal EPA codes are applicable. In accordance with 40 CFR 268.9(a), characteristic EPA Hazardous Waste Codes do not need to be identified for a listed waste, where the treatment standards for the listed waste addresses the characteristic. Because the treatment standard for F006, F007, and F009 address the toxicity characteristic for chromium and silver, D007 and D011 are not assigned to this waste stream. Consequently, no new EPA Hazardous Waste Codes were added to the EPA Hazardous Waste Codes assigned by AK for this waste stream.

If not, describe the basis for assigning the EPA Hazardous Waste Codes.

### NOTES:

- <sup>a</sup> A total of 7 samples were collected and analyzed. Analysis was performed for all analytes identified.
- <sup>b</sup> Identifies the number of samples in which the associated analyte was detected.
- <sup>c</sup> Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.
- <sup>d</sup> Statistics calculated based on using ½ the MDL values for all less-than-detectable observations with data transformation as identified (Reference 16). When transformation was applied, the Mean and UCL<sub>90</sub> values presented are the transformed values (Reference 16). No entry indicates no detectable measurements available for statistics.
- <sup>e</sup> RTLs correspond to the analyte PRQL for analytes that are not characteristic hazardous waste constituents.
- <sup>f</sup> No entry indicates that the applicable UCL<sub>90</sub> value did not exceed the associated RTL.

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Data Summary Report—Table 4: Total VOC Summary Data

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4A

| ANALYTE <sup>a</sup>                  | # Samples <sup>b</sup> | Transform Applied <sup>c</sup> | Normality Test (Pass/Fail) <sup>d</sup> | Min. Sample Size <sup>d</sup> | Mean <sup>d</sup> | UCL <sub>90</sub> <sup>d</sup> | Transformed RTL <sup>e</sup> | Un-Transformed RTL <sup>e</sup> (mg/kg) | EPA Code <sup>f</sup> |
|---------------------------------------|------------------------|--------------------------------|---|-------------------------------|-------------------|--------------------------------|------------------------------|---|-----------------------|
| 1,1-Dichloroethylene                  | 0                      |                                |   |                               | 0.089             |                                |                              | 14                                      |                       |
| trans-1,2-Dichloroethylene            | 0                      |                                |   |                               | 0.155             |                                |                              | 10                                      |                       |
| 1,2-Dichloroethane                    | 0                      |                                |   |                               | 0.155             |                                |                              | 10                                      |                       |
| 1,1,1-Trichloroethane                 | 0                      |                                |   |                               | 0.155             |                                |                              | 10                                      |                       |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | 0                      |                                |   |                               | 0.155             |                                |                              | 10                                      |                       |
| 1,1,2-Trichloroethane                 | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| 1,1,2,2-Tetrachloroethane             | 0                      |                                |   |                               | 0.18              |                                |                              | 10                                      |                       |
| Acetone                               | 0                      |                                |   |                               | 1.093             |                                |                              | 100                                     |                       |
| Benzene                               | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Bromoform                             | 0                      |                                |   |                               | 0.155             |                                |                              | 10                                      |                       |
| Butanol                               | 0                      |                                |   |                               | 1.093             |                                |                              | 100                                     |                       |
| Carbon disulfide                      | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Carbon tetrachloride                  | 0                      |                                |   |                               | 0.18              |                                |                              | 10                                      |                       |
| Chloroform                            | 0                      |                                |   |                               | 0.155             |                                |                              | 120                                     |                       |
| Chlorobenzene                         | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Ethyl benzene                         | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Ethyl ether                           | 0                      |                                |   |                               | 1.464             |                                |                              | 100                                     |                       |
| Isobutanol                            | 0                      |                                |   |                               | 1.093             |                                |                              | 100                                     |                       |
| Methanol                              | 1                      | Log                            | Pass                                    | 0.015                         | 0.521             | 0.713                          | 4.605                        | 100                                     |                       |
| o-Xylene                              | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| m,p-Xylene                            | 0                      |                                |   |                               | 0.155             |                                |                              | 10                                      |                       |
| Methyl ethyl ketone                   | 0                      |                                |   |                               | 1.464             |                                |                              | 100                                     |                       |
| Methylene chloride                    | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Tetrachloroethylene                   | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Toluene                               | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Trichloroethylene                     | 0                      |                                |   |                               | 0.18              |                                |                              | 10                                      |                       |
| Trichlorofluoromethane                | 0                      |                                |   |                               | 0.089             |                                |                              | 10                                      |                       |
| Pyridine                              | 0                      |                                |   |                               | 1.093             |                                |                              | 100                                     |                       |
| Vinyl chloride                        | 0                      |                                |   |                               | 0.089             |                                |                              | 4                                       |                       |

## NOTES:

- <sup>a</sup> A total of 7 samples were collected and analyzed. Analysis was performed for all analytes identified.
- <sup>b</sup> Identifies the number of samples in which the associated analyte was detected.
- <sup>c</sup> Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.
- <sup>d</sup> Statistics calculated based on using ½ the MDL values for all less-than-detectable observations with data transformation as identified (Reference 16). No entry indicates no detectable measurements available for statistics.

**Data Summary Report—Table 4: Total VOC Summary Data (continued)****NOTES (continued):**

- RTLs correspond to the analyte PRQL for analytes that are F-listed hazardous waste constituents or to the applicable total RTL value as calculated from the TC RTL. RTLs correspond to the analyte PRQL for analytes that are not F-listed or characteristic hazardous waste constituent.
- † No entry indicates that the applicable UCL<sub>90</sub> value did not exceed the associated RTL.

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## Data Summary Report—Table 4: Total VOC Summary Data (continued)

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4B

| TENTATIVELY IDENTIFIED COMPOUND (TIC)<br>CHEMICAL ABSTRACTS SERVICE (CAS) Number | Maximum Observed<br>Estimated Concentration<br>(mg/kg) | # Samples<br>Containing TIC |
|--|--|-----------------------------|
| No TICs identified in the VOC solid samples for the waste stream lot.            |  |                             |

Did the data verify acceptable knowledge? ☒ Yes ☐ No

Data as reported in Data Summary Report – Table 4 confirms acceptable knowledge in that no additional toxicity characteristic organic or F-listed solvent EPA codes, are applicable.

If no, describe the basis for assigning EPA Hazardous Waste Codes.

Data Summary Report—Table 5: Total SVOC Summary Data

WSPF # RF107.03

5A

| ANALYTE <sup>a</sup>              | #<br>Samples <sup>b</sup> | Transform<br>Applied <sup>c</sup> | Normality<br>Test<br>(Pass/Fail) <sup>d</sup> | Min.<br>Sample<br>Size <sup>d</sup> | Mean <sup>d</sup> | UCL <sub>90</sub><br><sub>d</sub> | Transformed<br>RTL <sup>e</sup> | Un-<br>Transformed<br>RTL <sup>e</sup><br>(mg/kg) | EPA<br>Codes <sup>f</sup> |
|-----------------------------------|---------------------------|-----------------------------------|---|-------------------------------------|-------------------|-----------------------------------|---------------------------------|---|---------------------------|
| 1,2-Dichlorobenzene               | 0                         |                                   |   |                                     | 0.129             |                                   |                                 | 10  |                           |
| 1,4-Dichlorobenzene               | 0                         |                                   |   |                                     | 0.129             |                                   |                                 | 150   |                           |
| 2,4-Dinitrophenol                 | 0                         |                                   |   |                                     | 0.171             |                                   |                                 | 40  |                           |
| 2,4-Dinitrotoluene                | 0                         |                                   |   |                                     | 0.114             |                                   |                                 | 2.6   |                           |
| 2-Methylphenol<br>(o-Cresol)      | 0                         |                                   |   |                                     | 0.129             |                                   |                                 | 40  |                           |
| 3-&4-Methylphenol<br>(m,p-Cresol) | 0                         |                                   |   |                                     | 0.229             |                                   |                                 | 40  |                           |
| Hexachlorobenzene                 | 0                         |                                   |   |                                     | 0.114             |                                   |                                 | 2.6   |                           |
| Hexachloroethane                  | 0                         |                                   |   |                                     | 0.129             |                                   |                                 | 60  |                           |
| Nitrobenzene                      | 0                         |                                   |   |                                     | 0.129             |                                   |                                 | 40  |                           |
| Pentachlorophenol                 | 0                         |                                   |   |                                     | 0.1               |                                   |                                 | 2,000   |                           |

## NOTES:

- <sup>a</sup> A total of 7 samples were collected and analyzed. Analysis was performed for all analytes identified.
- <sup>b</sup> Identifies the number of samples in which the associated analyte was detected.
- <sup>c</sup> Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.
- <sup>d</sup> Statistics calculated based on using ½ the MDL values for all less-than-detectable observations with data transformation as identified (Reference 16). No entry indicates no detectable measurements available for statistics.
- <sup>e</sup> RTLs correspond to the analyte PRQL for analytes that are F-listed hazardous waste constituents or to the applicable total RTL value as calculated from the TC RTL. RTLs correspond to the analyte PRQL for analytes that are not F-listed hazardous waste constituents or characteristic hazardous waste constituents.
- <sup>f</sup> No entry indicates that the applicable UCL<sub>90</sub> value did not exceed the associated RTL.

## CHARACTERIZATION INFORMATION SUMMARY

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Data Summary Report—Table 5: Total SVOC Summary Data (continued)

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5B

| TENTATIVELY IDENTIFIED COMPOUND (TIC)<br>CHEMICAL ABSTRACTS SERVICE (CAS) Number         | Maximum Observed<br>Estimated Concentration<br>(mg/kg) | # Samples<br>Containing TIC |
|--|--|-----------------------------|
| 1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester<br>(CAS No. 117-81-7) <sup>a</sup> | 9.4  | 7                           |
| Tetrachlorobiphenyl (CAS No. 26914-33-0)   | 8.2  | 1                           |
| 1,2-Benzenedicarboxylic acid, butyl octyl ester (CAS<br>No. 84-78-6)                     | 2.5  | 1                           |
| 1,2-Benzenedicarboxylic acid, butyl decyl ester (CAS<br>No. 89-19-0)                     | 0.95   | 1                           |

Did the data verify acceptable knowledge? ☒ Yes ☐ No

Data as reported in Data Summary Report – Table 5 confirm acceptable knowledge in that no toxicity characteristic organic or F-listed solvent EPA codes are applicable.

If no, describe the basis for assigning EPA Hazardous Waste Codes.

## NOTES:

- <sup>a</sup> TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging materials and so was not added to the target analyte list for the waste stream. TIC was determined not to be a listed hazardous waste based on comparison of the TIC identification to acceptable knowledge (see Reference No.18).



**Data Summary Report—Table 6: Exclusion of Prohibited Items****WSPF # RF107.03**

The absence of prohibited items is documented through acceptable knowledge. Radiography or visual examination is performed on each container in this waste stream to verify the absence of the following prohibited items:

- Liquid waste (waste shall contain as little residual liquid as is reasonably achievable by pouring, pumping and/or aspirating, and internal containers shall contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container. Total residual liquid in any payload container (e.g., 55 gallon drum or standard waste box) may not exceed 1 percent volume of that container.)
- Non-radionuclide pyrophoric materials
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Explosives or compressed gases
- Waste exhibiting the characteristics of ignitability, corrosivity or reactivity
- Non-mixed hazardous waste

Newly generated waste is characterized by visual verification (VV) at the time of waste packaging using the visual examination (VE) technique unless the use of radiography in lieu of, or in combination with, visual verification is justified by any of the following criteria:

- Visual verification was conducted during packaging, but was unacceptable,
- Visual verification requires extensive handling of high gram content waste that results in high radioactive exposure for the VV personnel,
- Situations where waste packaging is conducted at numerous locations generating small quantities of transuranic waste requiring a large number of VV personnel, and/or
- Where waste was originally packaged as low-level waste, but subsequently determined to be transuranic.

Each container of waste is certified and shipped only after radiography and/or VE either:

- Did not identify any prohibited items in the waste container, or
- All prohibited items found in a waste container by radiography or VE are identified and corrected (i.e., eliminated or removed) through the site non-conformance reporting system.

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Data Summary Report—Table 7: Correlation  
of Container Identification to Batch Data Reports

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| Package No. | Org. Package No. | Radioassay Data Package | Solid Sample Batch No. <sup>a</sup> | Metals Data Package <sup>a</sup> | VOC Data Package <sup>a</sup> | SVOC Data Package <sup>a</sup> | Headspace Sample Batch No. | Headspace VOC Data Package | RTR Data Package <sup>b</sup> | VE Data Package <sup>c</sup> |
|-------------|------------------|-------------------------|-------------------------------------|----------------------------------|-------------------------------|--------------------------------|----------------------------|----------------------------|-------------------------------|------------------------------|
| D64217      | D64217           | 440IP1-DP-032904        |                                     |                                  |                               |                                | 04W0224                    | HGAS-DP-00940              | 6T-2182                       |                              |
| D67028      | D67028           | 569IP1-DP-012703        |                                     |                                  |                               |                                | 03W0085                    | HGAS-DP-00442              | 5T-0332                       |                              |
| D67041      | D67041           | 440IP1-DP-122603        |                                     |                                  |                               |                                | 04W0127                    | HGAS-DP-00843              | MT-0050                       | VE-2004-002                  |
| D67195      | D67195           | 440IP1-DP-032204        |                                     |                                  |                               |                                | 04W0191                    | HGAS-DP-00907              | 6R-034                        |                              |
| D67475      | D67475           | 440IP1-DP-060303        |                                     |                                  |                               |                                | 04W0191                    | HGAS-DP-00907              | 6T-2185                       |                              |
| D67482      | D67482           | 440IP1-DP-040504        |                                     |                                  |                               |                                | 04W0220                    | HGAS-DP-00936              | MT-0054                       |                              |
| D68023      | D68023           | 440IP1-DP-052903        |                                     |                                  |                               |                                | 04W0203                    | HGAS-DP-00919              | 6R-033                        |                              |
| D68186      | D68186           | 440IP1-DP-030404        |                                     |                                  |                               |                                | 04W0161                    | HGAS-DP-00877              | 6R-019                        |                              |
| D68188      | D68188           | 440IP1-DP-030104        |                                     |                                  |                               |                                | 04W0161                    | HGAS-DP-00877              | 6R-032                        |                              |
| D68311      | D68311           | 440IP1-DP-033104        |                                     |                                  |                               |                                | 04W0227                    | HGAS-DP-00943              | 6R-025                        |                              |
| D68319      | D68319           | 440IP1-DP-052903        |                                     |                                  |                               |                                | 04W0193                    | HGAS-DP-00909              | 6T-2184                       |                              |
| D68428      | D68428           | 440IP1-DP-031604        |                                     |                                  |                               |                                | 04W0191                    | HGAS-DP-00907              | 6R-025                        |                              |
| D69138      | D69138           | 440IP1-DP-052903        |                                     |                                  |                               |                                | 04W0122                    | HGAS-DP-00839              | 6R-022                        | VE-2004-002                  |
| D72398      | D72398           | 440IP1-DP-033004        |                                     |                                  |                               |                                | 04W0224                    | HGAS-DP-00940              | 6R-021                        |                              |
| D72860      | D72860           | 440IP1-DP-111103        |                                     |                                  |                               |                                | 04W0188                    | HGAS-DP-00904              | 6R-019                        |                              |
| D72870      | D72870           | 440IP1-DP-052903        |                                     |                                  |                               |                                | 04W0203                    | HGAS-DP-00919              | 6R-032                        |                              |
| D72898      | D72898           | 569IP1-DP-012703        |                                     |                                  |                               |                                | 04W0217                    | HGAS-DP-00933              | 6R-031                        |                              |
| D08526      | D13675           | 569IP1-DP-012403        | WCS-0304                            | ALD03014M                        | ALD03010V<br>ALD03012N        | ALD03010S                      | 03W0085                    | HGAS-DP-00442              | 5T-0329                       |                              |
| D08527      | D59228           | 569IP1-DP-012403        | WCS-0304                            | ALD03014M                        | ALD03010V<br>ALD03012N        | ALD03010S                      | 03W0111                    | HGAS-DP-00463              | 5T-0329                       |                              |
| D08529      | D72396           | 569IP1-DP-012303        | WCS-0304                            | ALD03014M                        | ALD03010V<br>ALD03012N        | ALD03010S                      | 03W0132                    | HGAS-DP-00493              | 5T-0332                       |                              |
| D08530      | D73389           | 569IP1-DP-012303        | WCS-0304                            | ALD03014M                        | ALD03010V<br>ALD03012N        | ALD03010S                      | 04W0226                    | HGAS-DP-00942              | 5T-0332                       |                              |
| D08534      | D65610           | 569IP1-DP-012403        | WCS-0304                            | ALD03014M                        | ALD03010V<br>ALD03012N        | ALD03010S                      | 03W0074                    | HGAS-DP-00433              | 5T-0329                       |                              |
| DE0871      | D55596           | 440IP1-DP-060203        | WCS-0313                            | ALD03028M                        | ALD03025V<br>ALD03028N        | ALD03025S                      | 03W0344                    | HGAS-DP-00677              | 6T-2157                       |                              |
| DE0872      | D56519           | 440IP1-DP-060203        | WCS-0313                            | ALD03028M                        | ALD03025V<br>ALD03028N        | ALD03025S                      | 03W0349                    | HGAS-DP-00682              | MT-0041                       |                              |

<sup>a</sup> No entry indicates container was not selected or used for solid sampling.

<sup>b</sup> No entry indicates the container was characterized using visual verification.

<sup>c</sup> No entry indicates the container was characterized using radiography and not selected for visual examination to confirm radiography.

Acceptable Knowledge Summary

**WSPF # RF107.03**

RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 7.28, TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009) (attached).



**Rocky Flats Environmental Technology Site**

**ACCEPTABLE KNOWLEDGE INFORMATION**

**ACCEPTABLE KNOWLEDGE TRU/TRM  
WASTE STREAM SUMMARIES**

**RMRS-WIPP-98-100**

**Section 7.28**

**TRM Solidified Inorganic Waste**

**(F001, F002, F005, F006, F007, F009)**

**Profile No. RF107.03**

**Revision 3**

Reviewed for Classification/UCNI

By: Unclassified Not UCNI

Reference Exemption Number CEX-032-00

Date: August 25, 2004

**7.28 Transuranic Mixed (TRM) Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009)**

**Profile No. RF107.03**

**Acceptable Knowledge (AK) Waste Stream Summary**

Waste Stream Name: TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009)

Generation Buildings: Buildings 374, 750 PAD, 776<sup>(1,6)</sup>

Waste Stream Volume (Retrievably Stored): 318 55-gallon drums<sup>(1)</sup>

Generation Dates (Retrievably Stored): March 1982 - December 2003<sup>(1)</sup>

NOTE: Includes dates that waste was repackaged in Building 776. Also, waste may be repackaged at the 750 Pad in the future.

Waste Stream Volume (Newly Generated): 22 55-gallon drums<sup>(1)</sup>

NOTE: Newly generated waste is sludge removed from treatment equipment during decontamination and demolition (D&D) activities.

Generation Dates (Newly Generated): March 2004 – June 2004<sup>(1)</sup>

Waste Stream Volume (Projected): None<sup>(1)</sup>

Generation Dates (Projected): N/A

TRUCON Content Code<sup>(2)</sup>: RF111A/211A, RF111B/211B, RF111D/211D, RF111DF/211DF, RF111E/211E, RF111H/211H, RF111J/211J, RF111K/211K, RF111P/211P, RF111PF/211PF, RF127A/227A, RF127D/227D, RF127DF/227DF, RF127E/227E, RF127F/227F, RF127H/RF227H, RF127J/227J, RF127K/227K, RF127N/227N, RF127P/227P, RF127PF/227PF

Process Knowledge Demonstrates Flammable Volatile Organic Compounds (VOCs) in Headspace < 500 ppm: No (see Section 7.28.6)

**7.28.1 Transuranic Waste Baseline Inventory Report Information<sup>(3)</sup>**

Waste Isolation Pilot Plant (WIPP) Identification Number(s): RF-MT0007, RF-MT0803, and RF-MT0807

Summary Category Group: S3000 Waste Matrix Code Group: Solidified Inorganics

Waste Matrix Code: S3150<sup>(See Note A)</sup> Waste Stream Name(s): Bypass Sludge Bldg. 374/TRM, Solidified Sludge – Bldg. 774/TRM, and Solidified Sludge – Bldg. 374/TRM<sup>(See Note A)</sup>

Description from the Waste Isolation Pilot Plant (WIPP) Waste Baseline Inventory Report (WTWBIR): This waste stream is a solid cemented sludge.<sup>(See Note A)</sup>

NOTE A: The Waste Stream Name has been changed to TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009) to reflect that RF-MT0007, RF-MT0803, and RF-MT0807 have been combined into one waste stream. The Waste Stream Name for RF-MT0803 is incorrect in that the Solidified Sludge is from Building 374 and not from Building 774. The Waste Stream Description in the TWBIR requires clarification in that any liquid present will be as residual liquid in a quantity that is less than 1 vol. % in the payload container. Also, the Waste Stream Source information and United States Environmental Protection Agency (EPA) Comments in the TWBIR for RF-MT0007, RF-MT0803, and RF-MT0807 are incorrect because these waste streams only include IDC 007, 803, and 807 generated in Building 374, respectively, and do not include IDC 001 and 800 generated in Building 774. The Hazardous Waste Numbers in the TWBIR are incorrect, the correct Hazardous Waste Numbers are F001, F002, F005, F006, F007, and F009 (see Section 7.28.5). Waste Matrix Code S3150 is inappropriate, as the waste stream does not require further treatment for disposal, and has been re-designated Waste Matrix Code S3190 based on acceptable knowledge as provided in Section 7.28.2.

## 7.28.2 Waste Stream Description

TRM solidified inorganic waste assigned EPA Hazardous Waste Numbers F001, F002, F005, F006, F007, and F009 consists of solidified aqueous sludge [item description codes (IDCs) 007, 803, and 807]. This material was generated from the Building 374 aqueous liquid waste treatment operations; is similar in material, physical form, and hazardous constituents; and is therefore considered a single waste stream. Table 7.28-1 presents the waste matrix code and waste material parameter for TRM solidified inorganic waste.<sup>(4)</sup>

**Table 7.28-1, TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009)**

| IDC | IDC Description                      | Waste Matrix Code                                 | Waste Material Parameters | Weight % (Average) |
|-----|--------------------------------------|---|---------------------------|--------------------|
| 007 | Bypass Sludge – Bldg. 374            | S3190, Unknown/Other Homogeneous Solids           | Inorganic Matrix          | 100%               |
| 803 | Solidified Sludge – Bldg. 374        | S3190, Unknown/Other Inorganic Homogeneous Solids | Inorganic Matrix          | 100%               |
| 807 | Solidified Bypass Sludge – Bldg. 374 | S3190, Unknown/Other Inorganic Homogeneous Solids | Inorganic Matrix          | 100%               |

NOTE: The above waste material parameter addresses the waste material only and does not include internal packaging (e.g., inner bags), container packaging (e.g., fiberboard liner), absorbent, secondary waste, etc.

**IDC 007, Bypass Sludge – Building 374:** This material consists of inorganic sludge resulting from the treatment of aqueous liquids in the Building 374 Liquid Waste Treatment System. Prior to October 1982, the sludge was dried to a solid prior to packaging into drums. After October 1982, diatomite and Portland cement were added to the wet sludge during packaging to absorb any liquid waste. Small quantities of absorbent [oil dry or NoChar (i.e., a polymer absorbent)] may be added when necessary during repackaging to absorb potential residual liquid.<sup>(5,9,16)</sup>

**IDC 803, Solidified Sludge – Building 374:** This material consists of inorganic sludge resulting from the treatment of aqueous liquids in the Building 374 Liquid Waste Treatment System. During 1986, dried sludge was mixed with Portland cement and water in the Building 374 Direct Cementation Process (DCP) prior to packaging in drums. Small quantities of absorbent (oil dry

or NoChar) may be added when necessary during repackaging to absorb potential residual liquid. (5,9,16)

**IDC 807, Solidified Bypass Sludge – Building 374:** This material consists of inorganic sludge resulting from the treatment of aqueous liquids in the Building 374 Liquid Waste Treatment System. IDC 807 replaced IDC 007 in 1987. Diatomite and Portland cement were added to the wet sludge during packaging to absorb liquids until 1991 when equipment problems caused operations to be shut down. During Decontamination and Decommissioning (D&D) activities in 2004, the dry sludge remaining from the 1991 shut down was removed from the sludge processing equipment and packaged into drums with small quantities of NoChar when necessary to absorb potential residual moisture. Small quantities of absorbent (oil dry or NoChar) may be added when necessary during repackaging to absorb potential residual liquid. (5,9,16)

#### 7.28.3 Areas of Operation

TRM solidified inorganic wastes assigned EPA Hazardous Waste Numbers F001, F002, F005, F006, F007, and F009 were generated by the following defense operations in Buildings 374, 750 Pad, and 776: (5,6,7,8,9)

- Waste Treatment
- Waste Repackaging
- D&D

#### 7.28.4 Generation Processes

TRM solidified inorganic waste assigned EPA Hazardous Waste Numbers F001, F002, F005, F006, F007, and F009 was generated from aqueous liquid waste treatment operations in Building 374 which received aqueous liquid waste via the process waste transfer system. The transfer system received acid, basic, scrubber, and process sink wastes that were chemically and/or radioactively contaminated from operations within Buildings 559, 707, 774, 776, 779, 865, 881, and 883. The Building 374 treatment system also received aqueous liquid waste directly piped from Building 371, as well as non-pipeline aqueous liquid wastes (e.g., drums, bottles, etc.) from Buildings 334, 440, 444, 460, and 881. The acidic aqueous waste was treated by neutralization, and the neutral and basic aqueous liquid wastes were treated by the radioactive decontamination process. (5,7)

The acidic aqueous wastes, including spent evaporation process acid descaling solution (nitric and phosphoric acids), contained large quantities of metal ions (e.g., iron, plutonium, chromium) that are insoluble in basic solutions. These acidic aqueous wastes were neutralized with potassium hydroxide to produce a basic solution containing filterable solids. (5,7)

The neutral and basic aqueous wastes were treated in the second or third stage equipment of the three-stage precipitation, flocculation, and clarification process. Potassium hydroxide was added, if needed to adjust the pH to a basic solution.

Reagents, including magnesium sulfate, calcium chloride, and ferric sulfate, were added to form a floc, which precipitated the majority of the chemical and radioactive contaminants in the liquid waste stream. A flocculent was added to aid in the agglomeration of the precipitate. The liquid from the clarifier was returned to the precipitation feed tanks (if activity was above 13,500 pCi/l) or to the evaporator system (if activity was below 13,500 pCi/l). The precipitate slurry was drawn from the bottom of the clarifier tank. <sup>(5,7)</sup>

This basic solution from the neutralized acid aqueous wastes and the precipitate slurry from the clarifier(s) were combined in the feed tanks for the sludge process. In the sludge process, the supernatant decanted from the feed tanks was returned to the radioactive decontamination process. The slurry from the feed tanks was processed through a diatomite filter media on a rotating drum filter to trap the solids. The sludge and some filter media were continuously scraped off the drum filter. Prior to October 1982, the sludge was dried to a solid prior to packaging in the drum. Subsequent to October 1982, the wet sludge was immobilized using either the sludge dryer and direct cementation system or the bypass system. For the DCP, dried sludge, cement and water were metered into a paddle mixer and combined prior to placing the waste in a drum to produce a cemented waste product as IDC 803. The DCP process only operated in 1986. In the bypass system, cement and diatomaceous earth were metered into the drum with the wet sludge to absorb any liquid waste. The bypass sludge was initially identified as IDC 007 but was later replaced by IDC 807 in 1987. The bypass system was operated until August 1991, when operations were stopped due to mechanical problems. The extent of cementation varied between containers. <sup>(5,7)</sup>

During D&D activities in 2004, sludge was removed from the sludge dryer, direct cementation, and sludge bypass equipment. This dry sludge was packaged with a small amount of NoChar absorbent, if needed to absorb moisture, as IDC 807. <sup>(5)</sup>

Containers of TRM solidified inorganic waste are repackaged to meet WIPP Waste Acceptance Criteria (WAC) in Buildings 776 and 750 Pad. Small quantities of absorbent (oil dry or NoChar) may be added when necessary during repackaging to absorb potential residual liquid. <sup>(6,8,9,16)</sup>

Process flow diagrams can be found in the Backlog Waste Reassessment (BWR) Baseline Book and Waste Stream and Residue Identification and Characterization (WSRIC) Building Books referenced in Section 7.28.8.

#### 7.28.5 Resource Conservation and Recovery Act (RCRA) Characterization

This waste stream is characterized as a mixed waste. The specific BWR Baseline Book Subpopulations and WSRIC Process Numbers associated with TRM solidified inorganic wastes assigned EPA Hazardous Waste Numbers F001, F002, F005, F006, F007 and F009 are listed in the Waste and Environmental Management System (WEMS) AK Waste Stream Summary for Profile Number RF107.03. <sup>(6)</sup>



Visual examination of waste contents at the time of packaging and/or Real-time Radiography (RTR) is used to verify that the waste stream is not a liquid waste and does not contain explosives, non-radionuclide pyrophoric materials, compressed gases, or reactive waste. Although materials in this waste stream are derived from the treatment of cyanide bearing wastes, the waste is not cyanide-reactive and the cyanide concentrations are below the land disposal treatment standards. Therefore, this waste stream does not exhibit the characteristics of ignitability (D001), corrosivity (D002), or reactivity (D003).<sup>(12)</sup>

This waste stream is characterized as a listed waste based on the mixture and derived from rules. Therefore, the Solidified Sludge carries the same listed codes as the aqueous waste liquid feed to the Building 374 waste treatment system. EPA Hazardous Waste Numbers F001, F002, and F005 are assigned because the Building 374 waste treatment system had received aqueous waste liquids that were contaminated with regulated spent solvents (e.g., methyl ethyl ketone, methylene chloride, toluene, and 1,1,2-trichloro-1,2,2-trifluoroethane). EPA Hazardous Waste Numbers F006, F007, and F009 are assigned, because the Building 374 waste treatment system had received/treated aqueous wastes from electroplating operations (e.g., spent cyanide bath and rinse solutions that contained cadmium, chromium, nickel, and silver). The Building 374 aqueous liquid operations treated waste that was characterized as hazardous waste due to characteristic of toxicity for arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), mercury (D009), selenium (D010) and silver (D011). These characteristic codes were also originally identified in the TWBIR for this waste stream. However, based on historical analytical data of the sludge, the sludge waste only exhibits the characteristic of toxicity for chromium (D007). Also, in accordance with 40 Code of Federal Regulations (CFR) 268.9, it is Rocky Flats Environmental Technology Site (RFETS) policy not to assign characteristic EPA Hazardous Waste Numbers to a listed waste, where the treatment standards for the listed waste addresses the characteristic. Therefore, D007 is not assigned to this waste stream. Multi-source leachate (EPA Hazardous Waste Number F039) was also originally identified in the TWBIR for this waste stream; however, subsequent regulatory analysis has determined that this EPA Hazardous Waste Number does not apply to this waste stream. Therefore, only EPA Hazardous Waste Numbers F001, F002, F005, F006, F007 and F009 were assigned to this waste based on AK.  
(3,5,14,15)

Although F003-listed solvents, such as acetone, methanol, and xylene, were used in production operations, these solvents are listed solely for ignitability. Because the TRM solidified inorganic waste is not ignitable (i.e., are not assigned D001), EPA Hazardous Waste Number F003 is not assigned to this waste stream.<sup>(5)</sup>

The only documentation indicating that discarded chemical products, off-specification species, chemical residues, and spill residues thereof (40 CFR 261.33) were sent to Building 374 aqueous liquid waste treatment system indicates that P- and U-listed

waste was received in Building 374 during the period between 1995 and 1997. Because the sludge process was shut down in 1991, none of the TRM solidified inorganic waste (including the sludge removed from the equipment during D&D) was contaminated with liquid wastes containing P- and U-listed chemicals. In addition, no hazardous waste from specific sources (40 CFR 261.32) was generated at the site. Therefore no K, U, or P listings have been applied to this waste stream.<sup>(5)</sup>

Confirmatory solid samples were analyzed for total metal, VOCs, and semi-volatile organic compound (SVOC) constituents. Statistics were calculated based on using one-half the method detection limit (MDL) for less-than-detectable observations with data transformation applied where appropriate. Using this "WIPP directed" method, the calculated 90 percent upper confidence limit (UCL<sub>90</sub>) of the mean concentrations exceeded its associated regulatory threshold limit (RTL) value for chromium and silver. Because the treatment standards for EPA hazardous waste numbers F006, F007, and F009 addresses the toxic characteristic for chromium and silver, D007 and D011 were not assigned to this waste stream. Consequently, no new EPA Hazardous Waste Numbers are required to be added to the EPA Hazardous Waste Numbers F001, F002, F005, F006, F007, and F009 that were assigned by AK for this waste stream.<sup>(10)</sup>

Headspace gas sampling and analysis detected one VOC, toluene. Statistics were calculated based on using one-half the method detection limit (MDL) for less-than-detectable observations with data transformation applied where appropriate. Using this "WIPP directed" method, the calculated 90 percent upper confidence limit (UCL<sub>90</sub>) of the mean concentrations for none of the analytes was found to exceed its associated RTL. Therefore, the headspace data confirms the acceptable knowledge characterization that no new characteristic volatile organic or F-listed solvent EPA codes need to be added to the EPA Hazardous Waste Numbers assigned by AK for this stream.<sup>(11)</sup>

A portion of this waste stream, generated at RFETS, was sent to Idaho National Engineering and Environmental Laboratory (INEEL) for storage; however, the INEEL waste stream (BNINW218) was also assigned EPA Hazardous Waste Numbers D006, D007, D008, D009, D010, D011, and D032 in addition to F001, F002, F005, F006, F007, and F009. RFETS AK indicates that cadmium, chromium lead, mercury, selenium, and silver are present in this waste stream but that only chromium (D007) is present in concentrations above the RTL. There is no RFETS AK that hexachlorobenzene (D032) is present in this waste stream. Confirmatory solid sampling performed at RFETS detected chromium (D007) and silver (D011) in concentrations above the RTL; whereas, confirmatory solid sampling performed by INEEL detected chromium (D007) and mercury (D009). Because solid sampling performed at RFETS did not detect cadmium, lead, mercury, selenium, and hexachlorobenzene at concentrations above their RTLs, EPA Hazardous Waste Codes D006, D008, D009, D010, and D032 were not applied to the RFETS waste stream. Per RFETS policy not to assign characteristic EPA Hazardous Waste Numbers to a listed waste where the treatment standards for the listed waste addresses the characteristic,

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EPA Hazardous Waste Numbers D007 (chromium) and D011 (silver) were not applied.  
 (3,17,18)

1,2-Benzenedicarboxylic acid, bis (2-ethylhexyl) ester [Chemical Abstract Service (CAS) 117-81-7]], which is a U-listed compound, was detected as a tentatively identified compound (TIC) in the solid sampling data. An evaluation was completed that determined this compound was not used in the processes that generated this waste stream and are not present as unused commercial chemical products. Therefore, the presence of this TIC does not render the waste stream a U-listed hazardous waste. <sup>(13)</sup>

#### 7.28.6 Transportation

The payload containers in this waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. Flammable VOCs including toluene were identified in this waste stream based on the descriptions in the BWR Baseline Book, WSRIC Building Books, and headspace gas sampling and analysis. Therefore, flammable VOCs in the payload container headspace have the potential to exceed 500 ppm. All payload containers, including those that exceed 500 ppm flammable VOCs in the headspace gas, are evaluated for compliance with applicable TRAMPAC requirements using the eTRAMPAC system prior to shipment. Any containers not passing the eTRAMPAC compliance evaluation are identified and corrected through the site non-conformance reporting system. <sup>(5,11)</sup>

#### 7.28.7 Radionuclides

Table 7.28-2 summarizes the radionuclides that may be present in TRM solidified inorganic waste assigned EPA Hazardous Waste Numbers F001, F002, F005, F006, F007, and F009. <sup>(4)</sup>

**Table 7.28-2, TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, and F009)  
 Radionuclides**

| IDC | Description                        | Radionuclides                         | Rationale   |
|-----|------------------------------------|---------------------------------------|---|
| 007 | Bypass Sludge – Bldg. 374          | WG Pu, Am-241, Am-243, DU, EU, Np-237 | The source of radionuclides in this IDC originated from treatment of aqueous liquid waste from entire Site.     |
| 803 | Solidified Sludge-Bldg. 374        | WG Pu, Am-241, Am-243, DU, EU, Np-237 | The source of radionuclides in this IDC originated from treatment of aqueous liquid waste from the entire Site. |
| 807 | Solidified Bypass Sludge-Bldg. 374 | WG Pu, Am-241, Am-243, DU, EU, Np-237 | The source of radionuclides in this IDC originated from treatment of aqueous liquid waste from the entire Site. |

Key: WG Pu weapons-grade plutonium  
 Am-241 americium-241  
 Am-243 americium-243  
 DU depleted uranium  
 EU enriched uranium

Np-237 neptunium-237

#### 7.28.8 References

1. Wastren 2004. Interoffice Memorandum from M. L. Johnson to Waste Records Center. Current and Projected Waste Volumes for TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, and F009) RF107.03, MLJ-045-2004, July 8, 2004.
2. RFETS 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001.
3. DOE 1995. Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.
4. RMRS 2004. RFETS TRU Waste Acceptable Knowledge Supplemental Information. RF/RMRS-97-018, Revision 13.
5. RFETS 2004. Backlog Waste Reassessment Baseline Book, Waste Form 4, Building 374, Solidified Sludge.
6. Waste and Environmental Management System (WEMS) database.
7. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 374, Version 3.2.
8. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 776, Version 3.2.
9. RFETS 2004. Waste Stream and Residue Identification and Characterization Building 750 Pad, Version 7.0
10. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Statistical Solid Analysis Data Evaluation Report for Transuranic Mixed (TRM) Solidified Inorganic Waste [F001, F002, F005, F006, F007, and F009] (Waste Stream Profile RF107.03) Lot 1, TRG-155-04, May 20, 2004.
11. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF107.03 (TRM Solidified Inorganic Waste [F001, F002, F005, F006, F007, F009]) Lot 1, TRG-174-04, June 10, 2004.
12. WASTREN 2003. Interoffice Memorandum from Scott Smith to Waste Records. Reactivity Characteristic Evaluation for Waste Derived from Aqueous Liquid Waste Treatment Operations, SMS-008-2003. November 17, 2003.
13. WASTREN 2004. Interoffice memorandum from Vivian S. Sendelweck to Eric D'Amico, Tentatively Identified Compounds in TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009) Waste, Solid Sampling Lot 1, VSS-028-2004, July 14, 2004.
14. Kaiser-Hill 1996. Interoffice memorandum from Karan North to Distribution, Environmental Compliance Guidance No. 5 – Application of F039 Waste Code, KN-032-96, February 16, 1996.

15. Colorado Department of Public Health and Environment 1996. Letter from Frederick R. Dowsett to Florence J. Phillips, Use of F039 Listed Hazardous Waste Designation, February 21, 1996.
16. RFETS 2004. Solid Radioactive Waste Packing Requirements Manual, 1-M12-WO-4034, Version 10.
17. BNFL-5232-RPT-TRUW-15, Acceptable Knowledge Summary Building 374 Sludge, Revision 0, March 17, 2004
18. AMWTP Waste Stream Profile for Building 374 Sludge, Rev. 1, March 17, 2004